Separation of zirconium...

S/081/62/000/010/055/
B168/B180

soluzion. At 250 g/l the degree of salting-out is 96.7%, whereas if it is reduced to 36.7 g/l the degree of salting-out falls to 52.5%. Almost all impurities can be removed by washing the crystal hydrate with sulfuric acid containing 50% SO_3 followed by a second salting-out.

[Abstracter's note: Complete translation.]

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LAYNER, Abram Il'ich; PAZUKHIN, V.A., prof., doktor tekhn.nauk, red.;
EL'KIND, L.M., red.izd-va; VAYNSHTEYN, Ye.B., tekhn.red.

[Production of alumina] Proizvodstvo glinozema. Moskva, Gos.
nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii,
1961.   619 p.   (MIRA 14:4)
                         (Alumina)

S/149/61/000/001/005/013
A006/A001

AUTHORS: Layner, A.I., Kolenkova, M.A.

TITLE: Preparation of Potassium Fluoro-Zirconate Out of Zirconium Sulfate
               Solutions

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya,
               1961, No. 1, pp. 96 - 100

TEXT: The authors developed a method of obtaining potassium fluoro-zir-
conate assuring high zirconium extraction and eliminating deficiencies of previous
methods. The method consists in the leaching-out of conventional lime-zirconium
cake with sulfuric acid solutions. Experiments have shown that zirconium is al-
most fully extracted into the sulfate solution. After separating and washing of
the insoluble residue, the sulfate solution is processed with potassium fluoride.
The forming potassium fluoro-zirconate $Zr(SO_4)_2 + 6 KF = K_2ZrF_6 + 2K_2SO_4$ is pre-
cipitated from the solution during cooling. It appears, however, that the sulfate
solution is contaminated during the leaching out of the cake by iron, aluminum, ti-
tanium, calcium and magnesium impurities which also react with potassium fluoride,
forming poorly soluble plain and composite fluorides. To prevent contamination of

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Preparation of Potassium Fluoro-Zirconate Out of Zirconium Sulfate Solutions

the potassium fluoro zirconate with these impurities, it was necessary to determine condtions under which the precipitation of potassium fluoro-zirconate and of impurity fluorides takes place. For this purpose artificial sulfate solutions were prepared. The initial sulfate solution for the preparation of potassium fluoro zirconate was obtained by dissolving pure tetrahydrate zirconium sulfate in water; it contained 100 g/l ZrO_2. The KF solution of 394 g/l concentration was mixed with the zirconium sulfate solution at room temperature. Precipitation of potassium cryolite was effected by mixing 10 g/l Al_2O_3 solution with 394 g/l KF, for 30 minutes. For the precipitation of Fe_2O_3, iron cryolite was prepared using an initial solution of ferric oxide sulfate with a 8 g/l concentration of Fe_2O_3. The KF solution (394 g/l) was added to the sulfate solution. The mixture was stirred for 30 minutes. To investigate conditions of fluoro titanate precipitation a $Ti(SO_4)_2$ solution was prepared with a 3 g/l concentration of TiO_2. The initial solution for CaF_2 precipitation contained 2 g/l $CaSO_4$. The experiments showed that the pH values of the fluorides investigated varied depending on the amount of KF introduced (Figure 6). It was found that the pH value of the initial solution was an important factor in the precipitation of fluoro zirconate out of

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S/149/61/000/001/005/013
A006/A001

Preparation of Potassium Fluoro-Zirconate Out of Zirconium Sulfate Solutions

sulfate solutions contaminated with aluminum, iron, titanium and calcium sulfates. When mixing a zirconium sulfate solution containing the aforementioned impurities with KF, first potassium fluoro titanate is separated out; then fluoro zirconate in an amount of 97% is separated out at 107% of the stoichiometric quantity of KF. Aluminum and iron cryolites remain in the solution at a low pH value of the initial solution. Aluminum and iron cryolites and calcium fluorides are practically insoluble in the presence of potassium and fluor ions. Therefore these fluorides must be eliminated during their joint precipitation with fluoro zirconate of potassium, by subsequent dissolving of the residue in hot water. If a required acidity of the initial solution has been selected, and a certain excess of KF is present, it is possible to separate out potassium fluoro zirconate by recrystallization. This product is almost free of Ti, Fe, Al and Ca impurities.
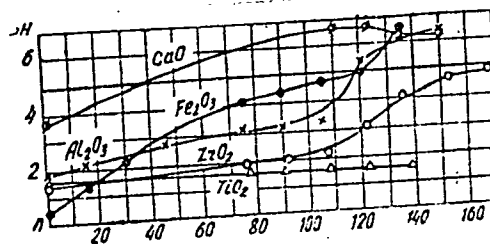
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S/149/61/000/001/005/013
A006/A001

Preparation of Potassium Fluoro-Zirconate Out of Zirconium Sulfate Solutions

Figure 6

The effect of the KF amount on changes in pH values of a zirconium sulfate solution contaminated with various impurities.

There are 6 figures and 2 tables.

ASSOCIATIONS: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals); Kafedra metallurgii legkikh metallov (Department of Metallurgy of Light Metals)

SUBMITTED: April 8, 1960

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S/149/61/000/002/005/017
A006/A001

AUTHORS: Layner, A.I., Kolenkova, M.A., Tsvetkova, A.V.

TITLE: Specific Weight and Viscosity of Beryllium Sulfate Solutions and Their Effect on the Filtration Rate

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1961, No. 2, pp. 76 - 80

TEXT: After filtration, diluted beryllium sulfate solutions are purified from aluminum admixtures by evaporation. Viscosity of the solution is one of the basic factors determining the filtration rate. Therefore the effect of temperature and concentration of the solution on their viscosity is of practical interest. Experiments were made with pure and commercial beryllium sulfate solutions. The pure solutions were prepared by dissolving crystalline beryllium sulfate at concentrations of 45.6; 30,4; 22.8 and 15.2 g/l of BaO. Relative viscosity was determined in a thermostat using an Ostwald viscosimeter and calculated by the formula $\eta = \eta_w \dfrac{\tau \gamma}{\tau_w \gamma_w}$, where η is the relative viscosity of the solution investigated at a given temperature, in c poise; η_w is the viscosity of water at

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S/149/61/000/002/005/017
A006/A001

Specific Weight and Viscosity of Beryllium Sulfate Solutions and Their Effect on the Filtration Rate

the same temperature, in c poise; t and t_{w} are the time of flow of the solution and the water, in sec; γ and γ_{w} are the specific weight of the solution and water in g/ml. Changes in the specific weight and viscosity of pure solutions depending on concentration and temperature of the solution are shown in Figures 1 and 2. At a BeO concentration, raised from 15.2 to 45.6 g/l, viscosity increases; it decreases at higher temperatures, in particular, within the 20 to 40°C range. Analogous experiments were made with commercial solutions obtained from beryllium by the conventional sulfatic method, with BeO concentrations ranging from 38.6 to 12.8 g/l. Results are given in Figures 3 and 4. It appears that at a similar concentration of BeO, commercial sulfate solutions have higher specific weight and viscosity than pure sulfate solutions; this is caused by the presence of numerous impurities. The experimental data obtained can be used to calculate the effect of temperature and concentration of sulfate solutions on the filtration rate, which depends on the viscosity of the pulp. Therefore, if the filtration rate of anyone of the solutions with a determined viscosity is known, the filtration rate of the other solution can be calculated by formula

$$v = \frac{\pi r^u}{t} \cdot p \cdot \frac{1}{\mu} ,$$

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Specific Weight and Viscosity of Beryllium Sulfate Solutions and Their Effect on the Filtration Rate

where μ is the viscosity of the solution, $kg.sec/m^2$; ν is the volume of the filtrate, l; τ is time, sec; r is the radius of capillary, mm; p is the difference in pressure at the capillary ends, kg/m^2; l is the length of capillary, m. Calculated data show that weaker solutions are less affected by temperature and concentration (Figure 5) than highly concentrated solutions. Therefore high temperatures must be maintained when filtrating strong solutions ($80-90^\circ C$). The following formulae are recommended: 1) to determine rapidly BeO concentration in pure solutions: $C = 322.5 [d_t + 0.26.10^{-5} (t-24)-320.6;$ (2); 2) to determine BeO concentrations during evaporation process or dilution of both pure and contaminated solution:

$$d_x = \frac{1,000\ d_{in} \pm w}{1,000 \mp w}$$ (3); where d_x is the specific weight of the

diluted or evaporated solution; d_{in} is the specific weight of the initial solution; W is the quantity of evaporated or added water; in milliliters for the denominator and in g/l of initial solution for the numerator. The minus sign for w is taken in case of evaporation of the initial solution, and the plus sign for the

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Specific Weight and Viscosity of Beryllium Sulfate Solutions and Their Effect on the Filtration Rate

case of dilution. The formula $C = d \, ctg \, \alpha$ (where C is the BeO concentration, g/l; d is the specific weight of the solution, α is the inclination angle of the concentration line to the absicca axis (Figure 6)) is recommended for the plotting of curves to determine BeO concentration by the specific weight of the solution without chemical analysis.
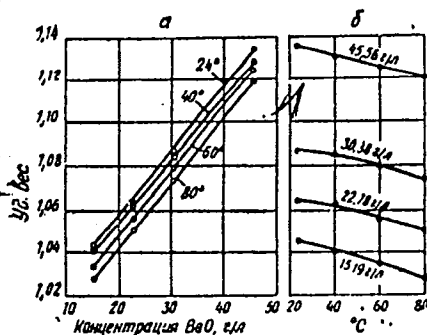
Figure 1:

Changes in the specific weight of pure sulfate solutions depending on BeO concentration (a) and temperature (b).
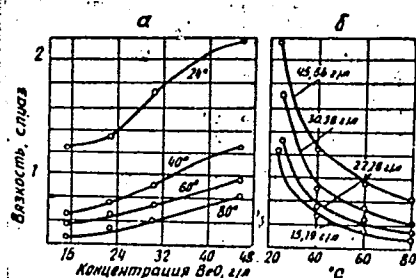
Card 4/7

S/149/61/000/002/005/017
A006/A001

Specific Weight and Viscosity of Beryllium Sulfate Solutions and Their Effect on the Filtration Rate
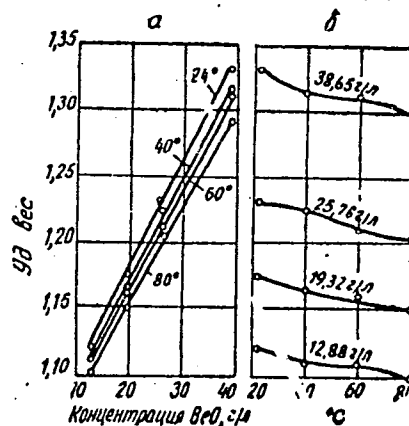
Figure 2:

Changes in viscosity of pure sulfate solutions depending on the concentration of BeO (a) and temperature (b)

Figure 3:

Changes in the specific weight of commercial sulfate solutions dpending on concentration (a) and temperature (b).

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Specific Weight and Viscosity of Beryllium Sulfate Solutions and Their Effect on the Filtration Rate

Figure 4:

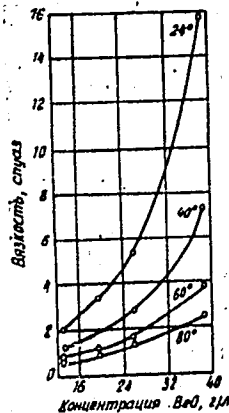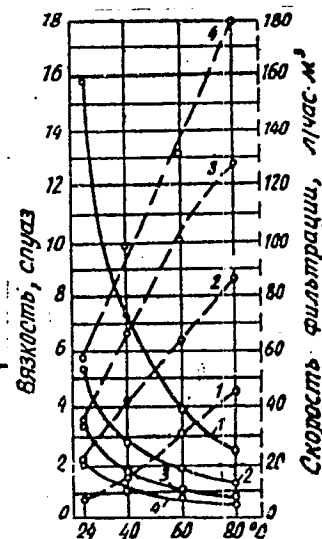The effect of BeO concentration on viscosity of commercial solutions.

Figure 5:

Dependence of viscosity (continuous lines) and filtration rate (dotted lines) of commercial solutions on temperature and concentration of BeO (1 - 38.65 g/l; 2 - 25.76 g/l; 3 - 19.32 g/l; 4 - 12.88 g/l).

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S/149/61/000/002/005/017
A006/A001

Specific Weight and Viscosity of Beryllium Sulfate Solutions and Their Effect on
the Filtration Rate

Figure 6:

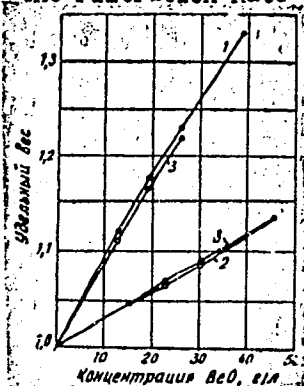Dependence of specific weight on BeO concentration in the
initial solution at $24^{\circ}C$. 1 - commercial solution; 2 - pure
solution; 3 - calculated data.

There are 3 tables and 6 figures.

ASSOCIATIONS: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of
Non-Ferrous Metals); Kafedra metallurgii legkikh metallov (Depart-
ment of Metallurgy of Light Metals).

SUBMITTED: May 17, 1960

Card 7/7

FREYDLIN, L.Kh.; ZHUKOVA, I.F.; ZIMINOVA, N.T.; LAYNER, D.I.; KAGAN, N.M.

Deactivation of sketetal nickel catalyst by water vapor and enhancement of its stability by means of promoters. Kin. i kat. 2 no.1:112-117 Ja-F '61.

1. Institut organicheskov khimii imeni N.D. Zelinskogo AN SSSR. Institut giprotsvetmetobrabotka.
(Catalysts, Nickel)

LAYNER, A.I.; KOLENKOVA, M.A.

Preparation of potassium fluozirconate from zirconium sulfate solutions. Izv. vys. ucheb. zav.; tsvet. met. 4 no. 1:95-100 '61.
(MIRA 14:2)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallurgii legkikh metallov.
        (Potassium fluozirconate)   (Zirconium sulfate)

GANOPOL'SKIY, V.I.; KOLENKOVA, M.A.; LAYNER, A.I.

Investigating the process of preparing a basic beryllium carbonate.
Izv. vys. ucheb. zav.; tsvet. met. 4 no.3:75-80 61.   (MIRA 15:1)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallurgii
legkikh metallov.
                    (Beryllium compounds)
                    (Carbonates)

S/149/61/000/004/003/008
A006/A101

AUTHORS: Kolenkova, M. A.; Layner, A. I.; Pankov, V. P.

TITLE: Studying the m a t e r i a l composition of zirconium-lime cake

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya,
no. 4, 1961, 102-104

TEXT: During sintering of zircon with lime in the presence of calcium chloride compounds are formed which are easily soluble in acids. It was assumed that they were composed of silicate and calcium zirconate. However, the material composition of the cake was as yet not investigated and the formation of the aforementioned compounds was not confirmed. The authors used data of roentgeno-structural analyses of calcium zirconate made in 1953 by E. K. Keller and N. A. Godina to study the material composition of the zirconium-lime cake in order to confirm the assumed presence of calcium zirconate. X-ray and crystallo-optical analyses showed that the cake consisted of a basic glassy amorphous substance which did not react to polarization light. The glassy substance was decrystal-lized by holding the crushed cake at 1,000 - 1,100°C for 1 hour and subsequent slow cooling. Crystallo-optical analyses of the decrystallized specimens showed

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Studying the   material composition ...

S/149/61/000/004/003/008
A006/A101

that the cake consisted of great amounts of calcium silicate and calcium oxide, ferric oxide, and a small residue of strongly modified zircon cake crystals. Moreover a high amount of a transparent, isotropic substance was revealed in the cake, which had a distinct crystalline structure of cubic syngony (or possible a pseudo-cubic one) of very high refraction (about 1.8 and more). Its optical characteristics given for the first time, are different from all known compounds. The authors assume that the substance revealed is calcium zirconate whose optical index was not yet established. This assumption was checked by comparing X-ray radiographs of calcium zirconate obtained by Keller and Godina with those of a decrystallized zircon-lime cake. Satisfactory coincidence of spectral lines and close dn values of the spectra indicate that the transparent, optically isotropic substance of 1.8 refraction index, corresponds to calcium zirconate. This proves that during sintering of zircon with calcium carbonate, zirconium dioxide forms calcium zirconate. There are 1 figure, 1 table and 1 Soviet-bloc reference.

ASSOCIATIONS: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals); Kafedra metallurgii legkikh metallov (Department of Metallurgy of Light Metals)

SUBMITTED: September 29, 1960

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S/149/62/000/002/006/008
A006/A101

_18 1Y 7_

AUTHORS: Kolenkova, M. A., Layner, A. I.

TITLE: Hydrolytical precipitation of zirconium subsulfate from sulfuric
            acid solutions

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya,
            no. 2, 1962, 112-117

TEXT: An investigation was made for the purpose of determining conditions
for hydrolysis of sulfate solutions with separation of crystalline zirconium
subsulfate which can be well filtered. Lime-zirconium cake of the following
composition was used: (in %) 26.26 ZrO_2 10.55 SiO_2; 2.12 Al_2O_3; 1.79 Fe_2O_3;
0.47 MgO; 0.43 TiO_2; 46.3 CaO. It was found that the precipitation of
excessive SO_4^{2-} ions with calcium chloride can be made from a sulfate solution
obtained from leaching out of the cake, or directly during the leaching out of
the lime-zirconium cake. Best results of precipitating SO_4^{2-} ions in the form
of calcium sulfate were obtained under the following conditions: the amount
of sulfuric acid for lixiviation was 100% of the stoichiometric quantity; the
amount of calcium chloride was 66% of the quantity required to bind the SO_4^{2-}

Card 1/3

Hydrolytical precipitation ...

ions; duration of leaching out the cake - 60 minutes with sulfuric acid, and 30 minutes after introducing a concentrated calcium chloride solution (total lixiviation time - 90 minutes); temperature - 85 to 95°C. The extraction of ZrO_2 in sulfuric acid lixiviation of lime-zirconium cakes in the presence of calcium chloride is by 1 - 2% lower than in lixiviation with sulfuric acid only. The molar SO_3 - ZrO_2 ratio of the solutions is then 0.5 - 0.9 and they are well suitable for hydrolysis. Zirconium sulfate solutions with low molar SO_3 - ZrO_2 ratio can be obtained also by lixiviation of a lime-zirconium cake with a quantity of acid, insufficient in respect to the stoichiometric amount. To obtain solutions with low SO_3 - ZrO_2 ratio, without admixture of calcium chloride, at high ZrO_2 extraction, the authors recommend double lixiviation of the cake. Initial lixiviation is performed with a deficiency of the acid and the solution is then hydrolyzed; secondary lixiviation is carried out with an excess of acid; the solution is recirculated to be used for initial lixiviation. The completeness of extracting crystalline zirconium subsulfate from sulfate solutions by hydrolysis depends on the molar SO_3 - ZrO_2 ratio of the initial solution and the final acidity of the solution. At a 0.5 - 0.9 ratio and 1.5 - 2.5 g/l H_2SO_4 final acidity, ZrO_2 extraction is 99 - 100%. The investigation has shown that zirconyl-sulfuric acid is not suitable for hydrolysis.

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S/149/62/000/002/006/008
A006/A101

Hydrolytical precipitation ...

Practically, complete hydrolysis with 100% separation of zirconium in the form of crystalline zirconium subsalt is only possible if the equilibrium according to reaction $ZrOSO_4 + H_2SO_4 \rightleftharpoons H_2[ZrO(SO_4)_2]$, is fully shifted to the left hand side on account of the precipitation of excessive sulfuric acid. There are 1 table, 3 figures and 2 Soviet-bloc references.

ASSOCIATIONS: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals); Kafedra metallurgii legkikh metallov (Department of Metallurgy of Light Metals)

SUBMITTED: July 14, 1961

Card 3/3

S/080/62/035/003/019/024
D202/D302

AUTHORS: Motina, A. G., Pazukhin, V. A., Layner, A. I. and
              Kolenkova, M. A.

TITLE: Distillation of cesium from pollucite by sintering
              with lime in vacuo

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 3, 1962, 664-666

TEXT: The authors separated Cs from pollucite by heating the brick-
etted mineral at 1200°C with stoichiometric amounts of $CaCO_3$, in
92% yields; an addition of CaF_2 (5% of pollucite weight) increased
the yield to about 98% (1 hour heating). All other alkali oxides,
present in pollucite, are eliminated as well, but Cs is easily se-
parated from their mixture by converting them to bromides and dis-
solving CsBr in Br_2. Experimental details are given. There are 3
tables and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The
references to the English-language publications read as follows:

Card 1/2

Distillation of cesium ...   S/080/62/035/003/019/024
                                              D202/D302

L. M. Pigeon and V. A. Alexander, Transactions AIME, 159, 315,
(1944); Chem. A., 46, 8, 3484, (1952).

ASSOCIATION: Institut tsvetnykh metallov imeni M. I. Kalinina
               (Institute of Non-Ferrous Metals imeni M. I. Kalinin)

SUBMITTED: May 4, 1961

Card 2/2

KOLENKOVA, M.A.; LAYNER, A.I.

Hydrolytic precipitation of basic zirconium sulfate from sulfuric
acid solutions. Izv. vys. ucheb. zav.; tsvet. met. 5 no.2:112-
117 '62.   (MIRA 15:3)

1. Krasnoyarskiy institut tsvetnhkh metallov, kafedra metallurgii
legkikh metallov.
                (Zirconium--Metallurgy) (Hydrometallurgy)

KOLENKOVA, M.A.; LAYNER, A.I.; MOTINA, A.G.

Preparation of potassium fluoride.   Izv.vys.ucheb.zav.; khim.i
khim.tekh.   5   no.1:115-119   '62.   (MIRA 15:4)

1. Krasnoyarskiy institut tsvetnykh metallov imeni Kalinina,
kafedra metallurgii legkikh metallov.
                    (Potassium fluoride)

S/080/62/035/008/006/009
D267/D308

AUTHORS: Layner, A.I., and Kolenkova, M.A.

TITLE: Purification of solutions of beryllium sulfate from
            iron and other impurities by electrolysis with a
            mercury cathode

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 8, 1962,
            1815 - 1820

TEXT: The authors studied the process involved in order to deter-
mine its efficiency and to determine the optimum conditions of pu-
rification, the importance of which is particularly great when
high-purity salts of beryllium are to be obtained. Procelain beakers
(1.5 l) with 3 kg of mercury were used as electrolyzers with a Pb
anode and the temperature of the electrolyte was 50 - 60°C. The
anode current density (D_a) was mostly constant (5 a/cm²), whereas
the cathodic current density (D_c) varied between 0.5 and 6 a/cm².
The BeO concentration was 14 - 40 g/l, and that of Fe_2O_3, 0.2 -

Card 1/2

Purification of solutions of ...

S/080/62/035/008/006/009
D267/D308

4.2 g/l. It was found that this method not only completely elimina-
tes the Fe impurity, but also many other impurities encountered
under industrial conditions. Increasing D_c from 1 to 6 a/dm^2 redu-
ced the time of complete elimination of Fe, but increased the spe-
cific consumption of energy. An increase in the concentration of
Fe_2O_3 increased the time of purification, the current efficiency
(η) and the specific energy consumption. The increase of pH incr _-
sed η and the bath efficiency, and reduced the consumption of ener-
gy. It is necessary to purify periodically the mercury from iron,
for which a method is suggested. There are 9 figures.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov imeni M.I.
Kalinina (Krasnoyarsk Institute of Non-Ferrous Metal
imeni M.I. Kalinin)

SUBMITTED: May 19, 1961

Card 2/2

LAYNER, A.I.; KOLENKOVA, M.A.; MASLENNIKOVA, A.S.

Investigating the process of treating leucite for alumina and
caustic potash. Sbor. nauch. trud. GINTSVETMET no.33:143-151
'60.   (MIRA 15:3)
                              (Leucite) (Alumina)

LAYNER, A.I.; KOLENKOVA, M.A.

Separation of zii onium from sulfate solutions by the salting
out method. Sbor. nauch. trud. GINTSVETMET no.33:152-160 '60.
(MIRA 15:3)

(Zirconium—Metallurgy)

MOTINA, A.G.; PAZUKHIN, V.A.; LAYNER, A.I.; KOLENKOVA, M.A.

Sublimation of cesium oxide from pollucite during its sintering with lime in vacuo. Zhur.prikl.khim. 35 no.3:664-666 Mr 62.

(MIRA 15:4)

1. Institut tsvetnykh metallov imeni M.I.Kalinina.
(Cesium oxide) (Lime) (Sublimation (Physical sciences))

LAYNER, A. I.; KOLENKOVA, M. A.; KOTIYEVA, L. U.

White mud as an activating additive in the desiliconization of
aluminate solutions. TSvet. met. 35 no.10:50-55 O '62.
(MIRA 15:10)

(Alumina)   (Leaching)

KOTIYEVA, L.U.; LAYNER, A.I.

Obtaining aluminate solutions with a high ratio of silicon in
autoclave desiliconizing. Izv. vys. ucheb. zav.; tsvet. met. 5
no.4:113-116 '62.   (MIRA 16:5)

1. Moskovskiy institut stali, kafedra metallurgii legkikh metallov.
                    (Alumina) (Autoclaves)

LAYNER, A.I.; KOTIYEVA, L.U.

Effect of specific surface and the activity of white slime
on the desiliconizing of aluminate solutions. Izv. vys. ucheb.
zav.; tsvet. met. 5 no.6:71-76 '62.   (MIRA 16:6)

1. Moskovskiy institut stali i splavov, kafedra metallurgii
i fizicheskoy khimii tsvetnykh metallov.
                    (Aluminum—Metallurgy)
                    (Hydrometallurgy)

L 15580-63   EWP(q)/EWT(m)/BDS   AFFTC/ASD   JD/JG

ACCESSION NR: AP3000980   S/0149/63/000/002/0114/0119

AUTHORS: Layner, A. I.; Kolenkova, M. A.

TITLE: Purification of zirconium sulfate solutions from iron and other admixtures by electrolysis with a mercury cathode

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 2, 1963, 114-119

TOPIC TAGS: zirconium sulfate, electrolysis, mercury cathode, ferric oxide, zirconium oxide

ABSTRACT: The purification setup consisted of a 1-liter porcelain beaker containing 1 kg of mercury serving as cathode. This was covered with the solution of zirconium sulfate in which a lead anode was immersed. The solution and mercury were stirred while the process was in progress. Samples of the issuing solution containing 40 gm/L ZrO_2 and 4.6 gm/L Fe_2O_3 were taken at 10- or 20-minute intervals and analyzed for iron content until the NH_4CNS test became negative. The cathode current varied from 8 to 24 amp/dm^2, while the anode current remained constant at 5 amp/dm^2. It was found that when the cathode current shifted from 6 to 12 amp/dm^2 the specific expenditure of electric energy went up sharply, while the yield of iron per unit of

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L 15580-63

ACCESSION NR: AP3000980

electricity showed a corresponding drop. On the other hand, no effect on the process was noticed when the temperature went from 25C to 65C. A change in the concentration of ZrO_2 from 25 to 94 gms/L resulted in a nearly three times higher efficiency of the process. The cleansing of the mercury from iron was accomplished by pressure filtration through a 20-mm layer of quartz sand. Orig. art. has: 10 figures.

ASSOCIATION: Institut stali i splavov. Kafedra kompleksnoy pereratotki polimetallicheskikh rud (Institute of Steel and Alloys. Chair of Complex Processing of Polymetallic Ores)

SUBMITTED: 04Aug62   DATE ACQ: 21Jun63   ENCL: 00

SUB CODE: ML   NO REF SOV: 003   OTHER: 003

Card 2/2

LAYNER, A.I.; KOTIYEVA, L.U.

Laboratory and pilot plant investigations on desiliconizing aluminate
solutions at atmospheric pressure and with large amounts of white
mud. TSvet. met. 36 no.8:57-62 Ag '63.   (MIRA 16:9)
                             (Aluminum—Metallurgy)

ACCESSION NR: AP4039007   8/0136/64/000/005/0066/0069

AUTHOR: Layner, A. I.; Kolenkova, M. A.; Shumeyko, A. I.; Kurlyand, V. M.

TITLE: Zircon - Soda Interaction

SOURCE: Tsvetny*ye metally*, no. 5, 1964, 66-69

TOPIC TAGS: melting, ZrSiO, caustic soda, sintering, leaching, extraction, ZrO sub 2

ABSTRACT: Considering the difficulties involved in the industrial melting of ZrSiO with caustic soda, the authors studied the decomposition of ZrSiO concentrates by Na in quantities necessary for the formation of zirconium silicate sodium by sintering. The effects of different amounts of sodium and of sintering temperatures was observed at 900, 1000 and 1100 C, with different Na_2CO_3; $ZrSiO_4$ ratios and an invariable molar ratio of Na_2CO_3: Al_2O_3, Fe_2O_3 and $TiO_2 = 1$. Assuming that soda dissociates upon the removal of CO_2, the ZrO_2 contents in the cake would decline as the amount of soda is increased and could be predetermined. Chemical analysis at 1100 C corroborated this possibility. Optimal sintering time for specimens with $Na_2O/ZrSiO_4 = 1$, 2 and held for 15 to 120 minutes at 1100 C was

Card 1/2

ACCESSION NR: AP4039007

60 minutes. For the purpose of extracting ZrO_2, ground specimens were leached with a 40% solutions of H_2SO_4. An increase in acid from 80 to 115% to the stoichiometric amount was found to enhance ZrO_2 extraction only up to 128%. An increase of 20 to 60 C in the leaching temperature raises ZrO_2 extraction from 70 to 93%. Further temperature increases have no effect. A double leaching cycle with stoichiometric quantities of the acid provided 97 - 97.5% ZrO_2 extraction. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: None

SUBMITTED: 00   DATE ACQ: 04Jun64   ENCL: 00

SUB CODE: MM   NO REF SOV: 000   OTHER: 000

Card   2/2

L 21202-65   EWT(m)/EPF(n)-2/EWP(t)/EWP(b)   Pu-4   IJP(c)/AFWD(c)   JD/
ACCESSION NR: AP5000941 WW/JG   S/0136/64/000/012/0056/0061

AUTHOR: Tolpygo, V.K., Layner, A.I.

TITLE: Interaction between zirconium and sodium sulfate in the presence of a reducing agent

SOURCE: Tsvetnyye metally, no. 12, 1964, 56-61

TOPIC TAGS: zirconium, sodium sulfate, reducing agent, zirconium refining

ABSTRACT: Sintering with sodium sulfate in the presence of a reducing agent was used to decompose a zirconium concentrate and thus yield acid-soluble Zr-Na compounds. The reduction of Na_2SO_4 by carbon evidently occurred in two stages:

$$2Na_2SO_4 + C = 2Na_2SO_3 + CO_2, \quad (1)$$
$$2Na_2SO_3 + C = 2Na_2S + 3CO_2, \quad (2)$$
$$Na_2SO_4 + 2C = Na_2S + 2CO_2. \quad (3)$$
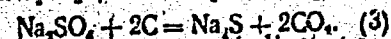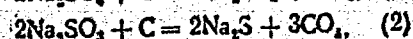
The change in the standard isothermal-isobaric potential of these reactions indicated that they can occur at about 700C and higher. The sulfite formed in reaction (1) reacts directly with Zr and the portion which does not have time to react is changed to a sulfide by the reaction: $3Na_2SO_4 + Na_2S \rightleftharpoons 4Na_2SO_3$ which can again form the so-called "secondary" sulfite which also interacts with the zirconium forming acid-soluble compounds.

Card 1/2

L 21202-65
ACCESSION NR: AP5000941 O

The investigations into the interaction between sodium sulfate and sulfite and zirconium demonstrated that for all practical purposes, sodium sulfate does not react with zirconium whereas sodium sulfite does, forming sodium zirconosilicate or zirconate and silicate depending on the composition of the charge. It was found that the interaction between zirconium silicate, sodium sulfate, and the reducing agent occurred according to the scheme

$$Na_2SO_4 + 2C = Na_2S + 2CO_2$$

$$3Na_2SO_4 + Na_2S = 4Na_2SO_3$$

$$\frac{4Na_2SO_3 + 4(ZrO_2 \cdot SiO_2) = 4(Na_2O \cdot ZrO_2 \cdot SiO_2) + 4SO_2}{4Na_2SO_4 + 2C + 4(ZrO_2 \cdot SiO_2) = 4(Na_2O \cdot ZrO_2 \cdot SiO_2) + 2CO_2 + 4SO_2}$$ (4)
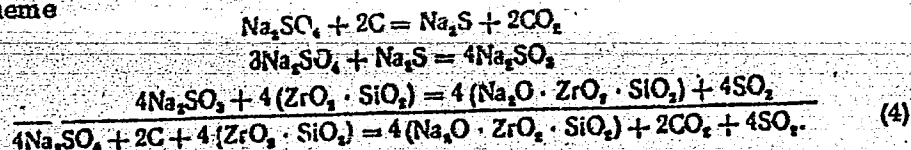
The most complete interaction occurred when Na_2SO_4: $ZrO_2 \cdot SiO_2 = 2.0$; $C:Na_2SO_4 = 0.5$; sintering temperature $= 1200C$; holding for 60 min. Orig. art. has: 4 tables, 2 figures, and 11 chemical equations.

ASSOCIATION: none

SUBMITTED: 00   ENCL: 00   SUB CODE: MM, IC

NO REF SOV: 001   OTHER: 002
Card 2/2

L 21203-65   EWT(m)/EPF(n)-2/EWP(t)/EWP(b)   Pu-4   IJP(c)/AFWD(c)   JD/
ACCESSION NR: AP5000942   WW/JG   S/0136/64/000/012/0061/0064

AUTHOR: Layner, A.I., Kolenkova, M.A., Sazhina, V.A.

TITLE: Precipitation of zirconium hydroxide from sulfate solutions

SOURCE: Tsvetnyye metally, no. 12, 1964, 61-64

TOPIC TAGS: zirconium, zirconium hydroxide, zirconium refining, filtration rate

ABSTRACT: The effect of the pH and precipitation temperature of zirconium hydroxide on its filtration rate was investigated. A sulfate solution was heated to 62-65C, neutralized with 25% ammonium hydroxide, and adjusted to the prescribed pH. The hydroxide was then precipitated with continuous mechanical mixing of the pulp. When the proper pH value was reached, the pulp was reheated, mixed for 5-7 min, and transferred to a Buchner filter, after which a vacuum pump was started and the filtration time clocked by a stopwatch. It was found that the highest filtration rate (472 kg/m^2 per hour) was obtained when the hydroxide was precipitated at 95C and pH 6-6.5 with washing by one-time repulping. Washing of zirconium hydroxide on the filter lowered the filtration rate to 223 kg/m^2 per hour. The effect of the thickness of the precipitate layer was also investigated. It was found that a layer thickness from 10 to 20 mm had a negligible effect on filtration time. The optimal conditions for precipitating zirconium

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L 21203-65
ACCESSION NR: AP5000942

hydroxide were: gradual neutralization of the sulfate solution by ammonia at 60-65C to pH 6.5, followed by heating of the suspension to 95C and holding at this temperature for 5-7 min. These conditions yielded 472 kg/m^2 dry hydroxide per hour. Orig. art. has: 5 figures and 2 formulas.

ASSOCIATION: none

SUBMITTED: CO　　　　　　ENCL: 00　　　　　SUB CODE: MM, IC

NO REF SOV: 002　　　　　OTHER: 000

Card 2/2

LAYNER, A.I.; KOLENKOVA, M.A.; KOTIYEVA, L.U.

Effect of the silicon module of the initial solution, the depth of decomposition and seeding, on the quality of the aluminum hydroxide during calcination. Izv. vys. ucheb. zav.; tsvet. met. 7 no. 4:101-106 '64 (MIRA 19:1)

1. Moskovskiy institut stali i splavov, kafedra radioaktivnykh metallov i kompleksnoy pererabotki polimetallicheskogo syr'ya.

LAYNER, A.I.; MAY-KI

Two-stage desiliconizing of pure potassium aluminate solutions at atmospheric pressure. T svet. met. 37 no.9:51-54 3 '64. (MIRA 18:7)

LAYNER, A.I.; BERENT, Ya.K.; KOLENKOVA, M.A.; BORISOV, G.B.

Obtaining copper-zirconium addition alloys from potassium fluoro-zirconate. TSvet.met. 38 no.3:87-90 Mr '65.   (MIRA 18:6)

(MIRA 13:5)

KOTLYAR, I.B.; LAYNER, A.I., KOLENKOVA, M.A.

New method of preparing return solutions for the leaching of nepheline sinters. Izv. vys. ucheb. zav.; tsvet. met. 8 no.3:58-64 '65.   (MIRA 18.9)

1. Moskovskiy institut stali i splavov, kafedra radioaktivnykh metallov i kompleksnoy pererabotki polimetallicheskogo syr'ya.

NASYROV, G.Z.; LAYNER, A.I.

Effect of potash lye and sulfates on the decomposition of
aluminate solutions in the complex treatment of alumite. Izv.
vys. ucheb. zav.; tsvet. met. 8 no.5:77-81 '65. (MIRA 18:10)

1. Moskovskiy institut stali i splavov, kafedra metallurgii
radioaktivnykh metallov i kompleksnoy pererabotki polimetalli-
cheskikh rud.

L 23717-66   EWT(m)/EWP(j)/T   RM

ACC NR: AP6007118

SOURCE CODE: UR/0079/66/036/002/0345/0347

AUTHOR: Lobusevich, N. P.; Golubtsov, S. A.; Layner, D. I.; Malysheva, L. A.; Trofimova, I. V.

ORG: none

TITLE: On the problem of promotors and poisons in the direct synthesis of methylchlorosilanes

SOURCE: Zhurnal obshchey khimii, v. 36, no. 2, 1966, 345-347

TOPIC TAGS: silane, bismuth, phosphorus, antimony, copper alloy, silicon alloy, zinc, chemical decomposition

ABSTRACT: The kinetics of the decomposition of Cu_3Si were studied during its reaction with methyl chloride in the presence of promotors (arsenic, phosphorus mixed with antimony and zinc) and contact poisons (bismuth and phosphorus). Addition of the most active promotors lowers the temperature at which the Cu_3Si alloy begins to react with methyl chloride from 330° to 270°C in the case of arsenic and from 330° to 290°C in the case of the phosphorus-antimony mixture. The activation energy of the reaction between Cu_3Si and methyl chloride decreases by one-half when these promotors are introduced. The action of the zinc promotor increases the reaction rate, but the activation energy remains practically unchanged. Apparently, elemental zinc converts into zinc chloride which accelerates the reaction of dimethyldichlorosilane formation. Ad-

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L 23717-66

ACC NR: AP6007118

dition of bismuth or phosphorus sharply inhibit the reaction of Cu_3Si with methyl chloride even at high temperatures (390°C). Orig. art. has: 1 figure.

SUB CODE: 07/   SUBM DATE: 01Dec64/   ORIG REF: 003/   OTH REF: 000

Card 2/2

S/080/62/035/012/007/012
D217/D307

AUTHORS: Ginberg, A.M. and Layner, B.D.

TITLE: Influence of the structure of the copper substrate
                on the structure of electrodeposited nickel

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 12, 1962,
                2679-2683

TEXT: The effect of varying certain conditions of electro-
deposition on the influence exerted by the orientation of a coarse-
grained copper substrate on the structure of an electrodeposited
nickel film was investigated. It was found that in the electrodepo-
sition of nickel from the usual sulfate-type solutions on to very
coarse-grained copper, the latter always exerts a pronounced influ-
ence on the orientation of the deposit. The film thickness to which
this influence persists depends however on the conditions of electro-
deposition. One of the governing factors is current density. With
increase in current density, the influence of the basis metal orien-
tation ceases at ever-decreasing film thicknesses, and a change in

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Influence of the structure ...   S/080/62/035/012/007/012
                                        D217/D307

current density after the film has attained a thickness of above
2000 Å has a particularly pronounced effect from this point of view.
The grain size and orientation at the substrate surface has a marked
bearing on the film thickness to which the orientation effect per-
sists. The latter increases with increase in grain size. In the
electrodeposition of nickel on to coarse-grained copper, nickel
grains of various sizes and orientations can form on the same speci-
men owing to the edge effect. There are 6 figures.

SUBMITTED: August 31, 1961

Card 2/2

CHISTYAKOV, Yu.D.; LAYNER, B.D.

Oriented growth of crystalline substances (epitaxy). Rost
krist. 4:209-221 '64.

(MIRA 17:8)

LAYNER, D.I.

CA

Investigation of the influence of small additions on the orientation of recrystallized Melchior alloy. D. I. Lainer and L. D. Kharitonova. *Izvest. Akad. Nauk S.S.S.R.*, Ser. Fiz. 15, 119-24(1951).—The influence of small amts. of the deoxidizers Mg, Si, P, Mn, and Zn on the mech. properties of Melchior (80% Cu and 20% Ni alloy) have been investigated. These mech. properties observed on deep-drawn bands or sheets are influenced by the anisotropy of recrystd phases. The results of x-ray analysis are compared with results obtained by other methods. Addn. of Zn or Mn gives high anisotropy, whereas addn. of Si gives isotropic material; Si is, therefore, recommended as the deoxidizer.
S. Pakswer

Inst. "*Giprotsvetmetobrabotka*"

Layner, D.I.

E-9

USSR/Solid State Physics - Structure of Deformation Materials.

Abs Jour: : Referat Zhur - Fizika, No 5, 1957, 11877

Author   : Layner, D.I., Krupnikova, Ye.I.
Inst   : —
Title   : Mechanism of the Influence of Small Additives to the Deformation of Recrystallization Textures in Metals and Alloys.

Orig Pub : Izv. AN SSSR, ser. fiz., 1956, 20, No 6, 693-594

Abstract : A study is made of the influence of additives on the formation of deformation and recrystallization textures in aluminum, copper, and nickel, as well as in "melchior." Small additives do not influence the formation of the deformation texture, but effect substantially the recrystallization texture. Addition of silicon to a melchior, of antimony to copper, of calcium to nickel, and of zinc to aluminum, in difinite concentrations, leads to a metallic walled surface in the recrystallized state with disoriented

Card 1/2

AUTHORS: Layner, D.I. and Potemkin, A. Ya., Candidates of Technical Sciences. (NII Giprotsvetmetobrabotka).

TITLE: Influence of additions of aluminium on the speed of reactive diffusion. (Vliyaniye dobavok k alyuminiyu na skorost' reaktivnoy diffuzii).

PERIODICAL: "Metallovedenie i Obrabotka Metallov" (Metallurgy and Metal Treatment), 1957, No.5, pp.33-35 (U.S.S.R.)

ABSTRACT: The bi-metal Ni-Al is used as a material for anodes of special radio tubes. In manufacturing strips of aluminised nickel reactive diffusion takes place, the result of which has a considerable influence on the quality of the components. In this paper the influence of the chemical composition of the Al on the reactive diffusion in aluminised nickel is investigated; it was found that silicon and certain other additions to aluminium bring about a considerable braking of the reactive diffusion and the authors propose a hypothesis explaining this braking effect. In the same way as in the case of iron, presence of silicon in aluminium leads to the formation during diffusion of complicated ternary compounds which form considerably slower than the binary compound Al_3Fe. This provides a real possibility of slowing down appreciably the diffusion process. As starting materials high purity (99.5%) nickel and aluminium (99.99%) were used, the purity of

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615

$L A Y N e r , D . I .$

137-58-5-10448

Translation from: Referativnyy zhurnal, Metallurgiya 1958, Nr 5, p 223 (USSR)

AUTHORS: Layner, D. I., Yemel'yanov, L. G.

TITLE: The Mechanism Whereby Silicon Influences the Processes of Inhibition of Reactive Diffusion of Iron in Aluminum (O mekhan-izme vliyaniya kremniya na protsessy tormozheniya reaktivnoy diffuzii zheleza v alyuminiy)

PERIODICAL: Tr. Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn. met. 1957. Nr 16, pp 2-17

ABSTRACT: An effort is made to clarify the influence of various additions on the reactive diffusion of Fe in Al. Grade AB 000 Al was used as the base for alloys with added Fe, Si, Be, Ti, Zn, Cr, Cu, and Li, and these alloys were investigated. Specimens of calor-ized Fe were annealed, and the structure of the diffusion layer was studied. Annealing at $420^{\circ}C$ for an hour indicated the harm-ful effect of the Fe, addition of which lead to a darkening of the surface as the result of formation of the $FeAl_3$ compound. Ad-dition of Si to Al on the other hand proves useful, as it inhibits the formation of this compound and leads to the formation of a more complex compound $Al_xSi_yFe_z$ which requires more time.

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137-58-5-10448

The Mechanism Whereby Silicon (cont.)

It is recommended that the Al used for cladding contain about 1% Si, since when the Si contents are greater annealing temperature will approach the melting point of the alloy Al-Si, and this will increase the rate of diffusion. Cu in the Ni-Al-Cu system has the same effect as Si in the Fe-Al-Si system, i.e., a ternary compound, NiAlCu, separates out in the process of anneal. The results obtained are confirmed by the data of metallographic and X-ray structure analysis.

L. M.

1. Iron--Diffusion   2. Silicon--Metallurgical effects   3 Diffusion--Inhibition

Card 2/2

137-58-6-13734

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 360 (USSR)

AUTHORS: Layner, D.I., Yemel'yanov, L.G.

TITLE: Use of the Electron Microscope for Investigation of the Structure of Metals and Alloys (Primeneniye elektronnogo mikroskopa dlya issledovaniya struktury metallov i splavov)

PERIODICAL: Tr. Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn. met., 1957, Nr 16, pp 18-23

ABSTRACT: A description of possible uses of the electron microscope for investigation of finely dispersed structures of various metals and alloys; a detailed description of methods of obtaining one- and two-phase prints.   Z.F.

1. Metals--Structural analysis   2. Electron microscopes--Applications

Card 1/1

LAYNER, D I

137-58-4-8188

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 263 (USSR)

AUTHORS: Layner, D.I., Krupnikova-Perlina, Ye.I.

TITLE: Effects of Adding Nickel, Silver, Lead, and Antimony on the Anisotropy of the Mechanical Properties of Recrystallized High-purity Copper (Vliyaniye dobavok nikelya, serebra, svintsa i sur'my na anizotropiyu mekhanicheskikh svoystv rekristalli-zovannoy medi vysokoy chistoty)

PERIODICAL: Tr. Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn. met. 1957, Nr 16, pp 24-26

ABSTRACT: The roles of various additives in the formation of recrystalli-zation textures are studied. With this object, the anisotropy of the elongation of Cu per unit length (AE) and that of its alloys with 0.29% Ni, 0.32% Pb, 0.42% Sb, and 0.12% Ag, cold-rolled to 96% deformation and annealed in vacuum at 700°C for 1 hour, was determined. Specimens for testing were cut at angles of 0, 45, and 90° to the direction of rolling. It is indicated that under these conditions Cu had a strong AE, related to the pre-sence of recrystallization texture. It was established that addi-tions of Sb and Ag markedly reduce the anisotropy, Sb virtually

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137-58-4-8188

Effects of Adding Nickel, (cont.)

destroying it. This is explained by the fact that the surface tension of Sb dif-
fers most strongly from that of Cu and Ag. Surface-tension-reducing Pb,
which is insoluble in Cu, and soluble Ni, which exhibits the same surface ten-
sion as Cu, did not affect the AE. The results adduced are explained by the
capacity of the surface-tension-reducing additives going into solid solution to
lead to disorientation of the structure of the metal on annealing.

A. B.

1. Copper--Mechanical properties--Effects of nickel   2. Copper--Mechanical
properties--Effects of silver   3. Copper--Mechanical properties--Effects of
lead   4. Copper--Mechanical properties--Effects of antimony

Card 2/2

LAYNER, DI

AUTHORS: Layner, D. I., Krupnikova-Perlina, Ye. I.

TITLE: An Investigation of the Effect of Certain Surface-tension-reducing Additives on the Formation of Recrystallization Texture in High-purity Nickel (Issledovaniye vliyaniya nekotorykh poverkhnost-noaktivnykh primesey na obrazovaniye tekstury rekristallizatsii nikelya vysokoy chistoty)

ABSTRACT: Qualitative investigation of the recrystallization texture of 99.99% pure Ni and its binary alloys with 0.21% Al, 0.12% Ti, 0.38% Th, and 2.76% W was performed by X-ray. The surface tension of these additives is lower than that of Ni. The specimens, cold-rolled to 86% deformation, were annealed in vacuum at 800°C for 1 hour. Pure Ni was found to have a recrystallization texture. Al, Ti, and W, forming solid solutions with Ni, facilitated formation of a disoriented structure, in confirmation of theoretical hypotheses drawn earlier. In view of the low solu-bility of Th, an addition thereof did not result in total elimina-

Card 1/2

137-58-4-8189

An Investigation of the Effect (cont.)

tion of the recrystallization texture. See RzhMet, 1958, Nr 4, abstract
8188.

A.B.

1. Nickel--Structural analysis--Surface tension factors   2. Nickel alloys
--Structural analysis--Surface tension factors   3. X-ray analysis--Applications

Card 2/2

LAYNER, D I.

137-58-5-10449

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 223 (USSR)

AUTHORS: Layner, D. I., Potemkin, A. Ya.

TITLE: The Effect of Increasing Complexity in a Chemical Compound
            upon the Rate of the Reactive Diffusion Process (Vliyaniye
            uslozhneniy khimicheskogo soyedineniya na skorost' protsessa
            reaktivnoy diffuzii)

PERIODICAL: Tr. Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn. met.,
            1957, Nr 16, pp 31-35

ABSTRACT: An investigation is made of the processes occurring in the
            annealing of Armco Fe clad by AB 000 aluminum with the follow-
            ing additions: 1% Si, 1% Mn, 1% Co, 1% Si+1% Mn, 1% Si+1%
            Co. Annealing was in the 600-640°C interval with holding times
            of from 1 sec to 30 min, followed by visual examination of the
            surface and microscopic analysis of cross sections of the speci-
            mens. It was found that the additions investigated form the fol-
            lowing sequence in terms of their effect as inhibitors of the pro-
            cess of reactive diffusion: Co, Mn, Si, Si+Mn, and Si+Co. The
            greatest thickness of diffusion layer is observed in a specimen
Card 1/2   clad by pure Al, and the smallest in cladding by Al+Co+Si. The

137-58-5-10449

The Effect of Increasing (cont.)

effect observed is related to the fact that the Co and Mn additions enter into the composition of the $Al_xSi_yFe_z$ phase, complicating its structure and thus inhibiting its formation. Introduction of Co and Si probably results in forming a compound $Al_xSi_yFe_zCo_u$. The role of Mn in alloys containing Si is reduced to complicating the solid solution with the $Al_xSi_yFe_z$ phase as base. Additions of Co and Mn to Al not containing Si are ineffective because ternary chemical compounds apparently do not come into being in three-component systems of Al-Mn-Fe and Al-Co-Fe.

L. M.

1. Iron--Heat treatment   2. Chemical compounds--Analysis   3. Iron--Diffusion
4. Diffusion--Inhibition

Card 2/2

137-58-4-7026

AUTHORS: Layner, D. I.,   Potemkin, A. Ya.

TITLE: Optimal Thickness of a Cladding Layer in Aluminum-clad Nickel
(Ob optimal'noy tolshchine plakiruyushchego sloya v alyuminiro-
vannom nikele)

ABSTRACT: Some results of a study of the effect of the thickness of the
cladding layer of the Al on the production of soft aluminum-clad
bright Ni, and on the service characteristics of vacuum-tube
anodes are presented.
                                                          S. G.

1. Electroplating--Thickness   3. Anodes--Characteristics

Card 1/1

137-58-6-12157

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 140 (USSR)

AUTHORS: Layner, D.I., Kharitonova, L.D.

TITLE: The Effect of the Degree of Deformation on Anisotropic Prop-
erties of Annealed Sheets of AVO Aluminum (Vliyaniye stepeni
deformatsii na anizotropiyu svoystv otozhzhennykh listov iz
alyuminiya AVO)

PERIODICAL·   Tr. Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn. met.,
1957, Nr 16, pp 39-46

ABSTRACT·   The effect of degree of deformation (DD) and of annealing
(A) temperature on the anisotropy of the mechanical properties
of Al was determined by the extent of "festooning" (F) which oc-
curred during deep drawing of cold-rolled annealed Al sheets.
It is shown that A at temperatures of 300, 350, and 400°C re-
sults in a complex relationship in which the magnitude of F is a
function of the DD which preceded the A operations; thus, max-
ima and minima of the F effect were observed at deformations
of 70 and 96%, and 50 and 90% respectively. Sheets which had
been annealed at 450° exhibited one maximum of F at a DD of 96%
but remained free of S at DD $\leq$ 50%. After A at 500 & 550° max

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137-58-6-12157

The Effect of the Degree of Deformation on Anisotropic Properties (cont.)

F was observed at DD of 90%; any decrease or increase of the DD reduced the F effect. In a number of instances, depending on the DD, a change was observed in the angle between the F and the direction of rolling. The results presented are explained by the formation of various types of recrystallization textures depending on the DD and the temperature of A. It is pointed out that it is possible to obtain a disoriented structure not only in the case of small deformations, but at large deformations as well.

A.B.

1. Aluminum--Deformation   2. Aluminum--Mechanical properties   3. Aluminum--Temperature factors

Card 2/2

LAYNER, D.I.

137-58-4-8416

Translation from: Referativnyy zhurnal, Metallurgiya. 1958, Nr 4, p 300 (USSR)

AUTHORS: Layner, D.I., Krupnikova-Perlina, Ye.I.

TITLE: The Effect of a Change in Rolling Direction on the Mechanical Properties of Strip Made of BrOF 6.5-0.4 Bronze (O vliyanii peremeny napravleniya prokata na mekhanicheskiye svoystva polos iz bronzy BrOF 6.5-0.4)

PERIODICAL: Tr. Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn. met. 1957, Nr 17, pp 34-37

ABSTRACT: Rolling with 90° turns has no significant effect on the degree of anisotropy of mechanical properties, but crushes the grains without significantly affecting their direction. Grain size is not related to the degree of anisotropy of the mechanical properties of BrOF. The laws characteristic of the deformation of certain face-centered metals cannot be applied mechanically to the deformation of BrOF.

N.G.

1. Bronze--Mechanical properties--Processing effects
2. Bronze--Deformation

Card 1/1

137-58-4-7640

Translation from: Referativnyy zhurnal. Metallurgiya, 1958. Nr 4. p 183 (USSR)

AUTHORS: Layner, D. I., Yemel'yanov L. G.

TITLE: A New Method of Annealing Calorized Iron (Novyy metod otzhiga alyuminirovannogo zheleza)

PERIODICAL: Tr., Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn. met., 1957, Nr 17, pp 47-53

ABSTRACT: An investigation was conducted to establish the possibility of annealing (A) aluminized Fe at high temperatures and very brief holding time. The A was performed in a salt bath (50 percent $NaNO_3$+50 percent KNO_3) at 670°C for periods of 1, 2, 3, 5, 10, 15, 20 and 30 sec. The experiments showed that at 670° total recrystallization of the Fe occurred in 2 sec time, but that the process of reactive precipitation did not materialize in such a short time, the surfaces of the specimens remaining bright and gleaming (X-rays of specimens of calorized Fe before and after A are adduced). Once the possibility of high-speed A of strips of calorized Fe was established, experiments in the A of such strips were conducted in a broaching furnace, as fast A in a salt bath is hardly applicable to long-term production operations (added

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137-58-4-7640

A New Method of Annealing Calorized Iron

plant equipment would be required). The optimum A temperatures (in a broaching furnace) when A is of 30 sec duration are: $610°$ for 0.10 mm strip and $630°$ for 0.20 mm strip.

A. B.

1. Iron alloys--Heat treatment

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67805

SOV/180-59-5-22/37

5.2100(4):

AUTHORS: Layner, D.I., and Tsypin, M.I.   (Moscow)

TITLE: Structure of the Scale in the First Stages of the
             Oxidation of Titanium

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh
             nauk, Metallurgiya i toplivo, 1959, Nr 5, pp 131-132 (USSR)

ABSTRACT: The authors state that in spite of the theoretical and
             practical importance of the oxidation of titanium,
             published work is limited to studies in pure oxygen
             (Refs 1, 2) or at very low pressures (Ref 3), or to
             impure titanium in air mainly for relatively long
             periods. Since the early stages, in which some of the
             numerous lower oxides are likely to participate, are
             specially interesting, the present authors studied the
             film produced on technical titanium sheet oxidized in a
             furnace at various temperatures. The films obtained
             below 800 oC were studied by electron diffraction;
             higher-temperature films by reflection. It was found
             (Table) that at 350-450 oC the main component is rutile
             and there is a previously observed (Ref 3) additional
             lime in the diffraction pattern characteristic for early
             stages of oxidation; at 500-650 oC a mixture of rutile

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SOV/180-59-5-22/37

Structure of the Scale in the First Stages of the Oxidation of
Titanium

with a little Ti_3O_5 is formed; at 700-750 °C the pattern
is almost exclusively that of rutile; the outer surface
of layers obtained at 800-900 °C consists of strongly
textured rutile, the inner surface separating easily from
the metal on oxidation for 3 hours gives the normal
pattern of polycrystalline rutile; films obtained at
350-750 °C have a preferred orientation (the Figure shows
electron diffraction patterns for perpendicular and
sloping incidence of the primary beam).

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There are 1 figure, 1 table and 7 references, of which
1 is Soviet, 1 is French, 3 are English and 2 are
Scandinavian.

05732

SOV/32-25-10-21/63

18(7)
AUTHORS: Layner, D. I., Tsypin, M. I.

TITLE: Methods of Investigating the Structure of Oxides Forming on
                Titanium

PERIODICAL: Zavodskaya laboratoriya, 1959, Vol 25, Nr 10, p 1209   (USSR)

ABSTRACT: Two mordants dissolving titanium but not titanium oxides were
                used for detaching thin titanium oxide layers for electron-
                ographic investigations. The mordants have the following
                composition: (1) 350 ml of HCl (conc.), 1 - 10 g of NaF, 650 ml of water,
                and (2) 10 ml of HF (conc.), 30 ml of HNO_3 (conc.), 30 g of $Pb(NO_3)_2$,
                950 ml water. As the structure of the oxide film corroded was
                equal for both mordants, only the first reagent was used.
                Titanium samples (1 X 10 X 25 mm) were oxidized for 10 minutes
                at different temperatures, and the resulting oxide film was
                corroded for 24 hours. The electronograms obtained (Fig 1)
                showed that on oxidation at 550° TiO_2 (rutile) is formed; oxide
                films giving an incomplete diffraction picture are obtained at
                350°, while thick oxide films are formed at 750°, the

Card 1/2

Methods of Investigating the Structure of Oxides
Forming on Titanium

05732
SOV/32-25-10-21/63

   electronograms of which have an intense background. The oxide
   films detached can be used as replicas for electron-microscopic
   investigations (Fig 2). There are 2 figures and 1 reference.

ASSOCIATION: Institut "Giprotsvetmetobrabotka" ("Giprotsvetmetobrabotka"
     Institute)

Card 2/2

LAYNER, U.I.

PHASE I BOOK EXPLOITATION   SOV/3404

Akademiya nauk SSSR. Institut metallurgii

Issledovaniye splavov tsvetnykh metallov; sbornik 2 (Analysis of Nonferrous Metal Alloys; Collection of Articles, [No.] 2) Moscow, Izd-vo AN SSSR, 1960. 204 p. Errata slip inserted. 2,300 copies printed.

Ed.: I.A. Oding, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: V.S. Klochkov; Tech. Ed.: T.P. Polenova; Editorial Board: A.A. Bochvar, Academician; M.Ye. Drits, Candidate of Technical Sciences (Deputy Resp. Ed.); M.V. Zakharov, Professor, Doctor of Technical Sciences; L.S. Lederer, Candidate of Technical Sciences (Resp. Secretary); A.M. Korol'kov, Doctor of Technical Sciences; M.V. Mal'tsev, Professor, Doctor of Technical Sciences; and I.A. Arzamasova, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for workers in scientific research institutes, metal and machine works, for teaching personnel, and for students attending schools of higher education.

COVERAGE: This is the second volume in a series ... on nonferrous and other metal alloys prepared by the Institute ... Institute A.A. Baykov ...

[remainder of text illegible]

88243

S/195/60/001/003/007/013
B013/B058

16.1153

AUTHORS: Lyubarskiy, G. D., Ivanovskaya, L. N., Isayeva, G. G.,
              Layner, D. I., Kagan, N. M.

TITLE: Study of the Catalytic Activity of Nickel Catalysts.
              II. Effect of the Admixtures of Transition Metals

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 3, pp. 385 - 392

TEXT: In this paper the authors studied the effect of admixtures of
transition metals to the nickel on its catalytic activity. It was the
aim of the paper to clarify the effect of these admixtures to the alloy
of nickel with aluminum or silicon on the specific activity of the
skeleton catalysts obtained after the leaching out of aluminum. Series
of nickel-aluminum alloys were prepared with various amounts of metal
admixtures (titanium, chromium, vanadium, molybdenum, iron, copper, and
cobalt) and with the same aluminum content (50% by weight). These ternary
alloys were crushed, leached out, and tested according to the method
described in Ref. 1. The activity of the samples was determined in a

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Study of the Catalytic Activity of Nickel   S/195/60/001/003/007/013
Catalysts. II. Effect of the Admixtures   B013/B058
of Transition Metals

continuous-flow circulation apparatus by means of benzene hydrogenation.
The experiments were conducted at temperatures of 27°, 32°, and $38^O C$ and
a hydrogen feed rate of 7 l/h per 1 cm^3 catalyst. The initial benzene concen-
tration was 1.5 mmole per 1 l benzene-hydrogen-vapor mixture. The surface
was determined by means of the BET method after the adsorption of nitro-
gen. The studies showed that the addition of chromium, titanium, molybde-
num and vanadium affects the activity of nickel aluminum catalysts only
slightly. The thermal stability of the samples is sufficiently high. The
catalytic activity of samples with chromium and titanium content is even
increased through treatment with hydrogen at $200^O C$. The samples with mo-
lybdenum content are, however, less stable when heated and show reduced
activity already at $150^O C$. The specific activity of nickel remains practi-
cally unchanged with an addition of up to 20 to 30 at% metal and on an
average amounts to $1.7 \cdot 10^{-4}$ $mol/h \cdot m^2$ at $38^O C$. The activity related to 1 g
catalyst shows a slight increase (by 15 to 20%) for smaller amounts of
admixtures (up to 5 to 7 at%). The observed steadiness of the specific

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Study of the Catalytic Activity of Nickel
Catalysts. II. Effect of the Admixtures
of Transition Metals

S/195/60/001/003/007/013
B013/B058

activity of the catalysts studied can be explained by the fact that the
metal admixtures mentioned form solid phases with nickel only to a limi-
ted extent. A study of the changes of the nickel-crystal parameter showed
that through the addition of 3 at% titanium, 6 at% aluminum, 8 at% va-
nadium or 10 at% chromium, the lattice is only changed by 0.01 A. In some
cases (chromium, titanium), these admixtures cause an improvement of the
properties important for the practice, such as stability, mechanical
strength of the granules etc. The high activity of the alloyed catalysts
studied permits to carry out the hydrogenation of benzene at temperatures
close to room temperature. It was shown that with respect to their acti-
vity, the skeleton catalysts surpass other known nickel catalysts which
were obtained through reduction of nickel oxides or -salts. The energy
of activation, calculated from the temperature coefficients, remains
almost constant and amounts to about 12 ± 1 kcal/mol, independent of the
composition. The constancy of the energy of activation, observed in all
catalysts studied, points towards a possibly equal mechanism of this
reaction. On the addition of cobalt and iron, similar results were ob-

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Study of the Catalytic Activity of Nickel   S/195/60/001/003/007/013
Catalysts. II. Effect of the Admixtures   B013/B058
of Transition Metals

tained as for other metals. There are 5 figures, 6 tables, and 11 refer-
ences: 5 Soviet, 4 US, 1 Belgian, 3 British, 1 French, and 1 German.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova
                (Physicochemical Institute imeni L. Ya. Karpov)

SUBMITTED: December 26, 1959

Card 4/4

S/195/60/001/004/010/015
B017/B055

AUTHORS: Layner, D. I., Kagan, N. M., Lyubarskiy, G. D., Isayeva, G. G.

TITLE: The Effect of Copper on the Catalytic Properties of a
             Skeleton Nickel Catalyst

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 4, pp. 576-582

TEXT: The authors investigated the decrease of catalytic activity,
magnetic susceptibility, and specific surface produced by dissolving out
aluminum from catalysts with increased copper content formed from
Al-Ni-Cu alloys. The dependence of magnetic susceptibility and activity
of skeleton catalysts (Cu + Ni) on the copper content is shown graphically
in Fig. 1. Fig. 2 represents the phase diagram of Al-Ni-Cu alloys
according to Köster (Ref. 9). The finely ground Al-Ni-Cu alloys were
leached out with 20% NaOH at 98-100°C. The phase composition of leached
alloys was examined radiographically. The relative results appear in
Fig. 3. Catalytic activity was determined by hydrogenation of benzene and
the specific surface by the BET method. The data obtained are tabulated.
The activation energy of the catalysts in hydrogenation of benzene was

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The Effect of Copper on the Catalytic
Properties of a Skeleton Nickel Catalyst

S/195/60/001/004/010/015
B017/B055

fairly constant at copper contents of 0 to 15 % by weight. The rapid
decrease in magnetic susceptibility and catalytic activity observed in the
case of leached alloys with increased copper content is due to a decrease
in the content of metallic nickel, which forms only from the ε phase
the content of which, however, rapidly decreases at 20% Cu. There are
5 figures, 1 table, and 10 references: 1 Soviet, 3 US, 3 British, and 3
German.

ASSOCIATION: Institut Giprotsvetmetobrabotka (State Design and Planning
                Scientific Research Institute for Working of Nonferrous
                Metals), Fiziko-khimicheskiy institut im. L. Ya. Karpova
                (Physicochemical Institute imeni L. Ya. Karpov)

SUBMITTED: February 20, 1960

Card 2/2

80216

S/126/60/009/04/011/033
E021/E435

18.7520

AUTHORS: Layner, D.I., Petrusevich, R.L. and Sollertinskaya, Ye.S.

TITLE: The Influence of Small Additions of Zinc on the Preference of Crystallographic Directions of Growth of Aluminium Crystals from the Melt

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 4, pp 535-541 (USSR)

ABSTRACT: The preferential crystallographic directions of growth of 99.99% aluminium with and without addition of 0.2% zinc were investigated by pulling crystals from the melt. They were determined by using bicrystals consisting of crystals with different orientations. A bicrystal was pulled from the melt in air at a rate of 0.6 mm/min with no special cooling arrangements. As it grew, one crystal outgrew the other. With pure aluminium bicrystals of [110] - [100] and [110] - [111], the crystal with the [110] orientation was usually outgrown. This is shown in Fig 2. Experiments with a [100] - [111] bicrystal showed that the [100] is the preferred orientation of growth (Fig 3). When 0.2% zinc was added to the aluminium, the most stable direction of growth was the [111] orientation (Fig 4).

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E021/E435

The Influence of Small Additions of Zinc on the Preference of Crystallographic Directions of Growth of Aluminium Crystals from the Melt

This is shown more clearly in macrophotographs of cross sections at various stages shown in Fig 5.   This confirms the hypothesis of selective absorption of zinc by the (111) planes of aluminium, which leads to an increase in the preference of growth in the [111] direction in relation to the [100] direction.   There are 9 figures and 10 references, 2 of which are Soviet, 7 English and 1 German.

ASSOCIATION: Institut „Giprotsvetmetobrabotka„
             (Institute „Giprotsvetmetobrabotka„)

SUBMITTED: July 2, 1959

Card 2/2

LAYNER, D.I.;   KRUPNIKOVA-PERLINA, Ye.I.

Mechanism of texture formation in metal and alloy recrystallization.
Fiz. met. i metalloved. 9 no. 4:542-544 Ap '60.   (MIRA 14:5)

1. Institut "Giprotsvetmetobrabotka."
          (Metallography) (Crystallization)

85039

18.8300   1530, 1520, 1138 only

S/126/60/010/004/007/023
E021/E435

AUTHORS: Layner, D.I. and Tsypin, M.I.

TITLE: The Structure of Scale on Titanium

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.4,
            pp.543-554

TEXT: Previous work had been carried out on relatively impure
titanium.   The present work used titanium containing only
0.045% Si and less than 0.01% remaining impurities.   No diffraction
pattern could be detected by electronic diffraction examination of
the surface of the specimens immediately after heating in vacuo,
which proves that an irregular structure is present on the surface.
Titanium hydride formed on the surface after etching in acid media
and it was not possible to obtain a sharp diffraction picture of
metallic titanium even after polishing on abrasive papers.   The
titanium sheet immediately after vacuum heating was therefore taken
as the starting material.   Oxidation was carried out in a muffle
furnace and the samples were cooled in air.   The main methods of
examining the structure of the scale produced were: electron
diffraction and X-ray analysis.   The former shows the structure of
a film 10^{-6} cm thickness and the latter 10^{-3} cm.   Oxidation at

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S/126/60/010/004/007/023
E021/E435

The Structure of Scale on Titanium

350 to 550°C produced thin films of oxide, reaching a constant thickness for a given temperature. The film was shown to be almost completely rutile. At higher temperature thicker films were produced which were also examined by metallographic techniques. At 700 to 850°C (up to three hours) two films were formed. The outer film was white and relatively thick and consisted of rutile with not less than 1.97 oxygen atoms to each titanium atom. The inner film was darker and much thinner. It was also shown to be based on rutile with a lower oxygen content (probably not less than 1.90). With increased temperature and time of oxidation, the outer film showed a sharply expressed orientation with the (301) planes parallel to the surface. Microhardness measurements showed that the inner film was harder than the white outer film. Oxidation at high temperature (850°C) by water vapour produced a film of rutile with the (001) planes parallel to the surface. It is proposed that oxidation by air takes place by direct chemisorption of molecules of oxygen and they take their place in the rutile lattice without preliminary dissociation into atoms. In the oxidation by water vapour, the orientation of the oxide

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E021/E435

The Structure of Scale on Titanium

is determined by the tendency for the densely packed titanium ions
to be placed parallel to their original surface of the metal, and
the adsorption effect plays little part.   The positions of the
ions are shown in Fig. 13 (for the (301) plane) and Fig. 14 (for the
(001) plane), the large circles being the oxygen ions and the small
circles titanium ions.   There are 14 figures, 2 tables and
13 references: 6 Soviet and 7 English.

ASSOCIATION: Giprotsvetmetobrabotka g. Moskva
              (Giprotsvetmetobrabotka, Moscow)

SUBMITTED: February 6, 1960

Card 3/3

LAYNER, D.I.; YEMEL'YANOV, L.G.

Catalyst preparation for the direct synthesis of silicon organic monomers. Trudy Giprotsvetmetobrabotka no.18:254-261 '60.

(MIRA 13:10)

(Catalysts)   (Chemistry, Organic--Synthesis)

LAYNER, D.I.; YEMEL'YANOV, L.G.

Ways of increasing the activity of skeleton nickel catalysts for a
hydrogenation reaction. Trudy Giprotsvetmetobrabotka no.18:262-277
'60. (MIRA 13:10)

(Catalysts)   (Hydrogenation)

LAYNER, D.I.; KRUPNIKOVA-PERLINA, Ye.I.

Kinetics of texture formation during the recrystallization of copper
and 80/20 "melchior". Trudy Giprotsvetmetobrabotka no.18:278-292
'60.   (MIRA 13:10)

(Copper alloys—Metallography)

LAYNER, D.I.; KHARITONOVA, L.D.

Observed deviations in investigation results obtained by various
methods of the preferred orientation in metals and alloys. Trudy
Giprotsvetmetobrabotka no.18:293-302 '60.   (MIRA 13:10)
        (Metallography)   (Crystal lattices)

LAYNER, D.I.; MALYSHEVA, L.A.

Corrosion destruction of copper-silicon alloys reduced to a powder-like state. Trudy Giprotsvetmetobrabotka no.15:303-312 '60.

(MIRA 13:10)

(Copper-silicon alloys—Corrosion)

LAYNER, D.I.; PETRUSEVICH, R.L.; SOLLERTINSKAYA, Ye.S.

Determining the orientation of aluminum single crystals by etching.
Zav.lab. 26 no.3:305-306 '60.   (MIRA 13:6)

1. Giprotsvetmetobrabotka.   ·
            (Aluminium--Metallography)

LAYNER, D.I.; NIKOL'SKAYA, I.M.

Modification of the structure of certain cast bronzes intended
for press working. TSvet. met. 33 nc.6:70-74 Je '60.
(MIRA 14:4)

(Bronze--Metallography)

LAYNER, D. I., MALYSHEVA, L. A., SOTNIKOVA, L. I.

Silicon-copper catalyzers and prospects for a considerable economy of copper. TSvet. met. 33 no.8:70-72 Ag '60.

(MIRA 13:8)

(Silicon-copper alloys)   (Catalysts)

29423
S/081/61/000/017/072/166
B110/B138

5 1190

AUTHORS: Layner, D. I., Emel'yanov, L. G.

TITLE: Problem of the production of catalysts for the direct syn-
thesis of organosilicon monomers

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 17, 1961, 325-326, abstract
17K118 (Tr. Gos. n.-i. i proyektn. in-ta po obrabotke tsvetn.
met., no. 18, 1960, 254-261)

TEXT: The authors studied the catalytic activity of silicon-copper alloys
and demonstrated that it is independent of the grain size of the initial
alloy. For this reason it is not necessary to obtain a fine-grained struc-
ture in casting. The authors demonstrated the expediency of using silicon-
copper alloys with reduced copper content (~3-5%) for the synthesis of
diethyl dichlorosilane. Ca, Zn and CSi additions have a positive influence
on the catalytic activity of the alloys. Silicon type Кр 2(Kr 2) is used to
produce the alloy which is done in graphite crucibles with low ash content.
It was found that ordinary 90% coke or 75% ferrosilicon could be used as
contact mass for the direct synthesis of phenyl trichlorosilane.

Card 1/2

Problem of the production of .....

29423
S/081/o1/000/017/072/166
B110/B138

[Abstracter's note: Complete translation.]

Card 2/2

30673

S/137/61/000/010/045/056
A006/A101

18.8300

AUTHORS: Layner, D.I., Malysheva, L.A.

TITLE: On the problem of corrosion failure of copper-silicon alloys until
              a powdery state

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 10, 1961, 47, abstract
              10I331 ("Tr. Gos. n.-i. i proyekto. in-ta po obrabotke tsvetn. met".,
              1960, no. 18, 303 - 312)

TEXT: Grade Кр-1 (Kr-1) Si (98.0%) and electrolytic Cu M0 (99.95%) were
used as materials to be investigated. Melting was performed in a high-frequency
induction furnace. Cast Cu-Si alloy specimens were subjected to: 1) annealing
in H_2O vapor atmosphere-at 600°C; 2) annealing in air at 600°C; 3) annealing
in air at 150°C. Some specimens were placed in retorts from which the air was
evacuated. The oxidation rate of the alloys was determined by the weight method.
The appearance and development of cracks in the oxidation process was registered
with the aid of a microscope. The weight, microscopical and roentgenostructural
analyses were employed to study the mechanism of disintegration. The Cu-Si al-
loys are 2-phase alloys consisting of Si and an intermetallic Cu_3Si (η -phase)

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On the problem of corrosion failure ...

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S/137/61/000/010/045/056
A006/A101

compound. The surface of a 2-phase alloy represents a 2-electrode element. Si
has a negative electrode potential and Cu a positive one. The intermetallic com-
pound possesses an own electrode potential. Intercrystalline corrosion begins
with corrosion failure at the grain boundaries, and is then transferred to the
intermetallic compounds and Si crystals; this entails the gradual failure of
the alloy. The authors studied the effect of temperature and atmosphere on the
oxidation process of the alloy. Oxidation proceeds at the highest rate in an
alloy containing 50% Cu and 50% Si. There are 9 references.

Ye. Layner

[Abstracter's note: Complete translation]

Card 2/2